

TOWN OF NORTHEADING, MASSACHUSETTS
STORMWATER MANAGEMENT RULES & REGULATIONS

**APPENDIX A
DEFINITIONS**

ABUTTER – The Owner(s) of land abutting the activity.

ALTERATION OF DRAINAGE CHARACTERISTICS – Any activity on an area of land that changes the water quality, force, direction, timing or location of runoff flowing from the area. Such changes include: change from distributed runoff to confined, discrete discharge, change in the volume of runoff from the area; change in the peak rate of runoff from the area; and change in recharge to groundwater on the area.

APPLICANT – Any person, individual, partnership, association, firm, company, corporation, trust, authority, agency, department, or political subdivision, of the Commonwealth of Massachusetts or the Federal government to the extent permitted by law requesting a Storm Water Management Permit for proposed land disturbance activity.

APPLICANT'S TECHNICAL REPRESENTATIVE – Registered Professional Engineer (P.E.) hired by the Applicant to certify that design and construction are completed in accordance with the applicable local, state, and federal storm water requirements. The Applicant's Technical Representative must be an Engineer of Record named with the initial Applicant who certifies all reports and record drawings. A formal change of Engineer of Record is necessary if P.E. changes during the permit process.

BEST MANAGEMENT PRACTICE (BMP) – Activity, procedure, restraint, or structural improvement that helps to reduce the quantity or improve the quality of storm water runoff.

CERTIFIED PROFESSIONAL IN EROSION AND SEDIMENT CONTROL (CPESC) – Certified specialist in soil erosion and sediment control. This certification program, sponsored by the Soil and Water Conservation Society in cooperation with the American Society of Agronomy, provides the public with evidence of professional qualifications.

CONSTRUCTION AND WASTE MATERIALS – Excess or discarded building or site materials, including but not limited to concrete truck washout, chemicals, litter, sanitary waste at a construction site that may adversely impact water quality, and clearing/grubbing wastes such as stumps and asphalt.

CLEARING – Any activity that removes the vegetative surface cover.

DEVELOPMENT – The modification of land to accommodate a new use or expansion of use, usually involving construction.

TOWN OF NORTHREADING, MASSACHUSETTS
STORMWATER MANAGEMENT RULES & REGULATIONS

**APPENDIX A
DEFINITIONS**

ENFORCEMENT OFFICER – Town of North Reading’s authorized agent to enforce construction and post-construction runoff controls. The Building Inspector is designated as the Enforcement Officer in Chapter 156-15 of the Town By Laws.

ENGINEER OF RECORD – Registered professional engineer of the State of Massachusetts.

EROSION – The wearing away of the land surface by natural or artificial forces such as wind, water, ice, gravity, or vehicle traffic and the subsequent detachment and transportation of soil particles.

EROSION AND SEDIMENT CONTROL PLAN – Document containing narrative, drawings, and details developed by a Registered Professional Engineer (P.E.) or a Certified Professional in Erosion and Sediment Control (CPESC), which includes best management practices (BMPs), or equivalent measures designed to control surface runoff, erosion and sedimentation during pre-construction and construction related land disturbances. The plan is required as part of the application for a Storm Water Management Permit.

ESTIMATED HABITAT OF RARE WILDLIFE AND CERTIFIED VERNAL POOLS – Habitats delineated for state-protected rare wildlife and certified vernal pools for use with the Wetlands Protection Act Regulations (310 CMR 10.00) and the Forest Cutting Practices Act Regulations (304 CMR 11.00).

GRADING – Changing the level or shape of the ground surface.

GRUBBING – The act of clearing land surface by digging up roots and stumps.

HOT SPOT – Land uses or activities with higher potential pollutant loadings, such as auto salvage yards, auto fueling facilities, fleet storage yards, commercial parking lots with high intensity use, road salt storage areas, commercial nurseries and landscaping, outdoor storage and loading areas of hazardous substances, or marinas.

IMPERVIOUS SURFACE – Any material or structure on or above the ground that prevents water infiltrating the underlying soil. Impervious surface includes without limitation roads, paved parking lots, sidewalks, and roof tops.

LAND DISTURBANCE – Any action that causes a change in the position, location, or arrangement of soil, sand, rock, gravel, or similar earth material.

LARGER COMMON PLAN OF DEVELOPMENT – Contiguous area where multiple separate and distinct construction activities are occurring under one plan.

TOWN OF NORTHREADING, MASSACHUSETTS
STORMWATER MANAGEMENT RULES & REGULATIONS

**APPENDIX A
DEFINITIONS**

MASSACHUSETTS ENDANGERED SPECIES ACT – (MGL c. 131A) and its implementing regulations at (321 CMR 10.00) which prohibit the “taking” of any rare plant or animal species listed as Endangered, Threatened, or of Special Concern.

MASSACHUSETTS STORMWATER MANAGEMENT POLICY – The Policy issued by the Department of Environmental Protection, and as amended, that coordinates the requirements prescribed by state regulations promulgated under the authority of the Massachusetts Wetlands Protection Act MGL c. 131A, § 40 and Massachusetts Clean Waters Act MGL c. 21, § 23-56. The Policy addresses storm water impacts through implementation of performance standards to reduce or prevent pollutants from reaching waterbodies and control the quantity of runoff from a site. The Policy is incorporated in the Wetlands Protection Act regulations at 310 CMR 10.05 (6)(k) through (q).

MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) or municipal storm drain system – The system of conveyances designed or used for collecting or conveying storm water, including any road with a drainage system, street, gutter, curb, inlet, piped storm drain, pumping facility, retention or detention basin, natural or man-made or altered drainage channel, reservoir, and other drainage structure that together comprise the storm drainage system owned or operated by the Town.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) GENERAL PERMIT FOR DISCHARGES FROM LARGE AND SMALL CONSTRUCTION ACTIVITIES – Permit required by the EPA for construction activities that disturb one (1) acre or more of land, either by itself or as part of a larger development. Permit requires a Notice of Intent (NOI) to be filed with the EPA and the development of a Storm Water Pollution Prevention Plan (SWPPP). A Notice of Termination (NOT) is filed with the EPA when the construction project is complete.

OPERATION AND MAINTENANCE PLAN – Plan setting up the functional, financial, and organizational mechanisms for the ongoing operation and maintenance of a storm water management system to insure that it continues to function as designed. The plan is required as part of the application for a Storm Water Management Permit.

OUTFALL – The point at which storm water flows out from a point source discernible, confined, and discrete conveyance into waters of the Commonwealth of Massachusetts.

OUTSTANDING RESOURCE WATERS (ORWs) – Waters designated by the Massachusetts Department of Environmental Protection as ORWs. These waters have exceptional sociologic, recreational, ecological and/or

TOWN OF NORTHEADING, MASSACHUSETTS
STORMWATER MANAGEMENT RULES & REGULATIONS

**APPENDIX A
DEFINITIONS**

aesthetic values and are subject to more stringent requirements under both the Massachusetts Water Quality Standards (314 CMR 4.00) and the Massachusetts Storm water Management Standards. ORWs include vernal pools certified by the Natural Heritage Program of the Massachusetts Department of Fisheries and Wildlife and Environmental Law Enforcement, all Class A designated public water supplies with their bordering vegetated wetlands, and other waters specifically designated.

OWNER — Person with a legal or equitable interest in property.

PERMITEE — Owner of the site.

PERSON — An individual, partnership, association, firm, company, trust, corporation, agency, authority, department or political subdivision of the Commonwealth of Massachusetts or the federal government, to the extent permitted by law, and any officer, employee, or agent of such person.

POINT SOURCE — Any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, or container from which pollutants are or may be discharged.

PRE-CONSTRUCTION — All activity in preparation for construction.

PRIORITY HABITAT OF RARE SPECIES — Habitats delineated for rare plant and animal populations protected pursuant to the Massachusetts Endangered Species Act and its regulations.

REDEVELOPMENT — Development, rehabilitation, expansion, demolition, or phased projects that disturb the ground surface or increase the impervious area on previously developed sites.

RUNOFF — Rainfall, snowmelt, or irrigation water flowing over the ground surface.

SEDIMENT — Mineral or organic soil material that is transported by wind or water, from its origin to another location; the product of erosion processes.

SEDIMENTATION — The process or act of deposition of sediment.

SITE — Any lot or parcel of land or area of property where land disturbances are, were, or will be performed.

SLOPE — The incline of a ground surface expressed as a ratio of horizontal distance to vertical distance.

SOIL — Any earth, sand, rock, gravel, or similar material.

TOWN OF NORTHREADING, MASSACHUSETTS
STORMWATER MANAGEMENT RULES & REGULATIONS

**APPENDIX A
DEFINITIONS**

STABILIZATION — The use, singly or in combination, of mechanical, structural, or vegetative methods, to prevent or retard erosion.

STORM WATER — Storm water runoff, snow melt runoff, and surface water runoff and drainage.

STORM WATER MANAGEMENT PLAN — Plan required as part of the application for a Storm Water Management Permit.

STORMWATER POLLUTION PREVENTION PLAN (SWPPP) — Plan required for permit coverage under the NPDES General Permit for Discharges from Large and Small Construction Activities. The SWPPP is a detailed plan describing how erosion and sediment controls and other best management practices (BMPs) will be implemented on a construction site.

STRIP — Any activity which removes the vegetative ground surface cover, including tree removal, clearing, grubbing, and storage or removal of topsoil.

TOWN — Town of North Reading, Massachusetts.

TSS — Total Suspended Solids.

VERNAL POOLS — Temporary bodies of freshwater which provide critical habitat for a number of vertebrate and invertebrate wildlife species.

WATERCOURSE — Natural or man-made channel through which water flows or a stream of water, including a river, brook, or underground stream.

WETLAND RESOURCE AREA — Areas specified in the Massachusetts Wetlands Protection Act MGL c. 131, § 40 and in the Town's General Wetland Protection Rules and Regulations.

WETLANDS — Tidal and non-tidal areas characterized by saturated or nearly saturated soils most of the year that are located between terrestrial (land-based) and aquatic (water-based) environments, including freshwater marshes around ponds and channels (rivers and streams), brackish and salt marshes; common names include marshes, swamps and bogs.

TOWN OF NORTH READING, MASSACHUSETTS
STORMWATER MANAGEMENT RULES & REGULATIONS

**APPENDIX B
DESIGN STANDARDS**

In order to complete the Stormwater Management Plan, Erosion and Sediment Control Plan, and Operation and Maintenance Plan as part of the permit requirements and ensure that developers and landowners meet Federal, State and Local standards, the Applicant shall use the following (most recent edition) references to aid in structural and non-structural best management practice (BMP) implementation:

- A. Massachusetts Department of Environmental Protection (MA DEP) Massachusetts Stormwater Handbook.
- B. MA DEP Erosion and Sediment Control Guidelines for Urban and Suburban Areas.
- C. MA DEP Hydrology Handbook for Conservation Commissions
- D. Massachusetts Department of Public Works "Highway Design Manual" Chapter 10, Drainage and Erosion Control.
- E. *"Construction Site Erosion Control and Sediment Controls: Planning, Design, and Performance"*, Robert Pitt, Donald Lake, and Shirley Clark
- F. *"Designing for Effective Sediment and Erosion Control on Construction Sites"*, Jerald Fifield
- G. USDA NRCS National Engineering Handbook, Part 630 Hydrology
- H. USDA NRCS TR-55, Urban Hydrology for Small Watersheds
- I. *"An Analysis of Extreme Rainfall Differences: Old TP-40 vs. New Cornell Atlas of Precipitation"*, Patrick Garner
- J. United States Environmental Protection Agency (US EPA) *Developing Your Stormwater Pollution Prevention Plan - A Guide for Construction Sites*

TOWN OF NORTH READING, MASSACHUSETTS
STORMWATER MANAGEMENT RULES & REGULATIONS

APPENDIX C
STORMWATER MANAGEMENT PLAN

A. **General.** The application for a Storm Water Management Permit shall include the submittal of a Storm Water Management Plan. This plan shall fully describe the project in reports, drawings & plans, which must be stamped and certified by the Applicant's Technical Representative, and will contain sufficient information for the Building Inspector and relevant Town Departments to evaluate the environmental impact, effectiveness, and acceptability of the proposed storm water measures.

B. **Submittals.** The Storm Water Management Plan shall consist of four submittals:

1. Letter of Transmittal
2. MA DEP Checklist for Stormwater Report
3. Stormwater Report with hydrology, hydraulic & storm water analysis & design
4. A set of plans of the proposed activity

C. **Letter of Transmittal.** This submittal will consist of the following:

1. Project Title/ Development Name,
2. Site address, assessors map & parcel number of the property and properties affected,
3. Contact Information. Name, address, and telephone numbers of the Owner(s), Developer, Applicant, and Engineer/ Surveyor / other professional person(s) or firm(s) preparing the plan,
4. Executive Summary:
 - (a) A description of the project,
 - (b) A locus map at a scale of 1" = 800',
 - (c) The existing zoning and land use at the site including if the site is located in any Town overlay districts,
 - (d) A description of the existing and proposed conditions & land use,
 - (e) Drainage / Stormwater Summary
 - (1) Pre & post (and during) peak development flow calculations & BMP summary,
 - (2) Infiltration system calculations and BMP summary
 - (3) TSS removal calculations and BMP summary
 - (f) Report author & contact information

D. **MA DEP Checklist for Stormwater Report.** Applicant shall provide a completed MA DEP Checklist for Stormwater Report and will address Standards 1-10.

E. **Stormwater Report** Calculations shall address the following:

1. **Peak Flow Attenuation** (MA DEP Stormwater Checklist Standard 2). Follow the general procedures in the MA DEP *Stormwater Handbook* and the MA DEP *Hydrology Handbook for Conservation Commissioners* (*Post peak flow must be < that pre peak flow*)

TOWN OF NORTH READING, MASSACHUSETTS
STORMWATER MANAGEMENT RULES & REGULATIONS

APPENDIX C
STORMWATER MANAGEMENT PLAN

- (a) Evaluate the Town drain system to verify existing conditions & hydraulic capacity. The developer shall mitigate all hydraulic capacity or structural issues within the Town drain system to allow discharge from the proposed development
- (b) Describe pre, post, and during development drainage conditions (narrative and illustration on pre-development plans) to include NRCS soil type and the existing & proposed vegetation and ground surfaces for each,
- (c) Describe all existing & proposed sub catchment areas to include off site areas draining to the property
- (d) Describe existing and proposed impervious and pervious areas within each sub catchment (narrative and on plans)
- (e) Provide pre & post development CN number calculations
- (f) Provide pre & post development Tc calculations
- (g) Provide pre & post development hydraulic calculations for the 24 hour 2, 10, 25, and 100-year storm events. Detention facilities shall accommodate all runoff, up to and including the run-off generated by the 100-year, 24- hour storm.
- (h) Use TP-40 peak rainfall as modified by the Cornell Atlas (RR-93-5):

2 yr	3.2 inches/ 24 hours
10 yr	4.8 inches/ 24 hours
25 yr	6.0 inches/ 24 hours
50 yr	7.0 inches/ 24 hours
100 yr	8.5 inches/ 24 hours

- (i) Provide pre & post development hydrographs showing time-stage relationship (peak flow, peak hour)
- (j) Provide a summary of pre and post-development flows
- (k) Infiltration flows from recharge structures can not be subtracted from post-development flow calculations
- (l) Provide proposed peak attenuation BMP calculations, design & plans
 - (1) Detention / retention basins- see below plus MA DEP Stormwater Handbook design criteria
 - (2) Other BMPs – Use MA DEP Stormwater Handbook design criteria
- (m) Provide the BMP hydraulic profile for all design storms (upstream manhole to outlet control structure (OCS)).

2. Recharge (MA DEP Stormwater Checklist Standard 3). Follow the general procedures in the MA DEP Stormwater Handbook and the MA DEP Hydrology Handbook for Conservation Commissioners (*infiltrate change in impermeable area*)

- (a) Provide test pit (TP) data (locations shall be shown on pre-and post-construction plans) - minimum of three TP per recharge site
- (b) Determine & document the seasonal high groundwater elevation & depth to bedrock – both depth below surface & elevation
- (c) Determine & document the soil type/ saturated soil hydraulic conductivity

TOWN OF NORTH READING, MASSACHUSETTS
STORMWATER MANAGEMENT RULES & REGULATIONS

APPENDIX C
STORMWATER MANAGEMENT PLAN

- (1) One TP per each 5000 SF of infiltration area and at least three TP per recharge area
- (2) Laboratory soil textural analyses for each TP sample are required
- (3) Title V percolation tests are not acceptable
- (d) Determine & document 72 hour BMP dewatering calculations
- (e) Provide proposed recharge BMP calculations, design & plans
 - (1) Detention basins- see below plus MA DEP Stormwater Handbook design criteria
 - (2) Other BMPs – Use MA DEP Stormwater Handbook design criteria
- (f) Provide the BMP hydraulic profile for all design storms (upstream manhole to outlet control structure (OCS)).
- (g) Recommend 100% roof runoff recharge, and/ or on site reuse if site conditions permit
- (h) Soils information will be based on site test pits logged by a Massachusetts Approved Soil Evaluator, or a registered Professional Engineer.

3. Water Quality (MA DEP Stormwater Checklist Standards 4 & 5). Follow the general procedures in the MA DEP Stormwater Handbook and the MA DEP Hydrology Handbook for Conservation Commissioners (**80% TSS removal**)

- (a) Address Land Uses With Higher Potential Pollution Control (LUHPPL) (Hotspots)
- (b) Describe Best Management Practice method proposed to improve water quality, including discharges to critical areas
- (c) Provide proposed TSS removal BMP sizing calculations, design & plans
 - (1) Detention / retention basins- see below plus MA DEP Stormwater Handbook design criteria
 - (2) Other BMPs – Use MA DEP Stormwater Handbook design criteria
- (d) Provide the BMP hydraulic profile for all design storms (upstream manhole to outlet control structure (OCS)).
- (e) Provide for oil separation in all catch basins (sumps and hoods)
- (f) Provide multiple access points for the maintenance of subsurface structures
- (g) Redevelopment of previously developed sites is not exempt from these regulations
- (h) The use of infiltration practices without pretreatment is prohibited
- (i) Provide a Long Term Pollution Prevention Plan that includes measures to prevent illicit discharges to the stormwater management system, including wastewater discharges and discharges of stormwater contaminated by contact with process wastes, raw materials, toxic pollutants, hazardous substances, oil, or grease

4. Detention /Retention Basin BMPs

- (a) Provide a general description of proposed basin & basin sizing calculations
- (b) Provide peak in and outflow calculations for the 2, 10, 25, and 100-year storm events
- (c) Provide hydrographs showing time-stage relationship inside basin (peak flow, elevation, and hour) for the 2, 10, 25, and 100-year storm events
- (d) Provide for a 3:1 basin side slopes or flatter & install a low permeability core material keyed into existing sub grade within berm footprint

TOWN OF NORTH READING, MASSACHUSETTS
STORMWATER MANAGEMENT RULES & REGULATIONS

APPENDIX C
STORMWATER MANAGEMENT PLAN

- (e) Describe the proposed method of construction for berms and quality assurance/ quality controls methods to assure low permeability and stability
- (f) Provide construction details and details
- (g) Provide for 1 foot of freeboard for the 100 year event
- (h) Provide detention basin sections showing elevations of storm events
- (i) Provide a minimum of two feet (2') of naturally occurring soils between the detention basin bottom and the maximum annual ground water table to ensure groundwater does not impact basin operation (provide at least three TPs per detention / retention pond)
- (j) Provide outlet control structure (OCS) details with elevations
- (k) Recommend OCS with a low flow discharge and grated top to minimize required maintenance for proper operation.
- (l) Construct rip rap emergency overflow spillway with a uniform, level crest in natural soil
- (m) Construct basin discharge piping with a flared end & rip rap apron
- (n) Install seepage collars around discharge pipe
- (o) Provide sufficient access for vehicles to facilitate inspection & maintenance of structure (top of berm top; basin perimeter; and sediment fore bay inspection/ sediment removal)
- (p) Enclose basin with gated six (6) foot fence or a continuous design element (i.e. railing or hedge) when interior side slopes are greater than 3:1.
- (q) Provide a fixed sediment depth indicator/ marker post to facilitate inspection
- (r) Maximum total depth of detention/retention area shall be six feet (6') as measured from the lowest outlet point to the lowest point of the emergency overflow
- (s) Each storm water detention/retention area shall be provided with a method of emergency overflow in the event of a storm in excess of the 100-year frequency type.

5. General Drainage Design & Plan Requirements

- (a) See DPW Standard Engineering Details for design standards
- (b) Existing & proposed surface features and underground utilities must be shown on plans
- (c) Proposed storm water drain structures must be shown in both plan view and profile and shall include rim elevations, invert elevations and details.
- (d) Standard precast concrete catch basins with a minimum 4 (four) foot sump and a trap hood will be used.
- (e) Onsite water quality treatment stormwater treatment BMP must be installed prior to its connection with the town system
- (f) On-site drain pipes (pipes & catch basin laterals) will have a ten (10) inches minimum diameter (supply pipe sizing calculations)
- (g) Proposed drain shall have a manhole for connection to the town drain system.
- (h) Proposed storm water drain lines must indicate the length, size, type, class, slope of pipe and method of connection to the town drain system.
- (i) Flow velocity within the pipe to be > 2 ft/s (self cleaning) or < 14 ft/s (minimize scour)

TOWN OF NORTH READING, MASSACHUSETTS
STORMWATER MANAGEMENT RULES & REGULATIONS

APPENDIX C
STORMWATER MANAGEMENT PLAN

- (j) All drainage pipes in the public way / town easement shall have a minimum diameter of 12 inches & Class III RCP shall be used
- (k) Proposed culverts shall be sized for a 100 year frequency runoff and hydraulic analysis & calculations shall be supplied
- (l) Private drain pipe material can be RCP, PVC or HDPE CPP, however must provide structural support calculations & details if top of pipe has less than 4 feet of cover
- (m) Provide a minimum cover over pipe of 4.0 feet; if pipe is shallower, provide structural support calculations & construction details
- (n) Any off site surface discharge to the public way or onto abutting properties that causes flooding and/ or negative impacts will not be allowed.
- (o) Design the drainage piping and catch basin inlets for 25 yr runoff frequency with a minimum 12 inch diameter pipe in public way / city easement
- (p) Intermittent surface water courses and such as swales, forebays, detention/retention basins shall be vegetated and appropriately reinforced along the low flow channel.

F. **Plans.** This submission shall consist of a complete set of development plans & shall include the following:

1. Plan Sheet Titles – see DPW Site Plan Review checklist for specific requirements:

- (a) Cover sheet
- (b) Legend, Abbreviations, and General Notes
- (c) Site Survey plan
- (d) Existing Site Condition plan
- (e) Demolition and Erosion Control plan
- (f) Construction / Layout plan
- (g) Grading and Drainage plan
- (h) Utility plan
- (i) Landscape plan
- (j) Detail sheets

2. Plan Notes. Plan will include the towns standard General Notes and Erosion Control and Dewatering Notes at a minimum.

3. Nonstructural Storm Water Management Strategies.

(a) To the maximum extent practicable, nonstructural storm water management strategies shall be incorporated into the design. The Applicant shall identify the nonstructural measures incorporated into the design of the project. If the Applicant contends that it is not feasible for engineering, environmental, or safety reasons to incorporate any nonstructural storm water management measures into the design of a particular project, the Applicant shall identify the strategy considered and provide a basis for the contention.

TOWN OF NORTH READING, MASSACHUSETTS
STORMWATER MANAGEMENT RULES & REGULATIONS

APPENDIX C
STORMWATER MANAGEMENT PLAN

(b) Nonstructural storm water management strategies incorporated into site design shall:

- Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss,
- Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces,
- Maximize the protection of natural drainage features and vegetation,
- Minimize the decrease in the "time of concentration" from pre-construction to post-construction,
- Minimize land disturbance including clearing and grading,
- Minimize soil compaction,
- Provide low-maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers and pesticides,
- Provide vegetated open-channel conveyance systems discharging into and through stable vegetated areas, and
- Provide other source controls to prevent or minimize the use or exposure of pollutants at the site, in order to prevent or minimize the release of those pollutants into storm water runoff. Such source controls include, but are not limited to:
 - Site design features that help to prevent accumulation of trash and debris in drainage systems,
 - Site design features that help to prevent discharge of trash and debris from drainage systems,
 - Site design features that help to prevent and/or contain spills or other harmful accumulations of pollutants at industrial or commercial developments, and
 - When establishing vegetation after land disturbance, applying fertilizer in accordance with standard best management practice (BMP) practices.

(c) When one or more of the Standards cannot be met, an Applicant may demonstrate that an equivalent level of environmental protection will be provided.

DPW SITE PLAN REVIEW CHECKLIST

Development: _____ Submittal Date: _____

Address: _____ Checked By: _____

General

This plan checklist is applicable to projects submitting for a Town of North Reading Storm Water Management permit

Five (5) hardcopy and one (1) digital copy (CAD & PDF) of the proposed activity plans shall be submitted to the Building Inspector for his/ her review as well as review by other Town Departments, Boards & Commissions.

Minimum sheet size shall be 24" x 36" unless otherwise approved prior to submission

Set shall be comprised of separate sheets as listed below unless otherwise approved by the Town Engineer at the pre-application session

All plans shall be stamped by Commonwealth of Massachusetts-registered Professional Engineer, Professional Land Surveyor, and/or Professional Landscape Architect, as appropriate

All plans oriented so that north arrow points to top of sheet

All plans shall be shown at 1" = 40' or less and shall show a graphical scale

All plans shall have a title block comprised of the following:

- Project Title
- Sheet Title
- Sheet Number
- Registrant Stamp (PE, PLS, LA)
- Engineer's name, address
- Scale
- Plan Issue Date
- Plan revision Dates(s)
- Street address(s) of the project area parcels.

1. Cover Sheet

Title Block

- Project name/title
- Street number and/or lot number Assessor's map and parcel number(s)
- Names and addresses of property owner, applicant, engineer, developer, architect and landscape architect
- Revision Date Block

Zoning District

Zoning Requirements Table-"Required vs. Provided"

- Lot Size
- Lot Frontage
- Side Yard Setback
- Front Yard Setback
- Rear yard Setback
- Building Height

DPW SITE PLAN REVIEW CHECKLIST

- Lot Coverage
 - Parking Spaces – total #, # compact, # handicap, parking space sizes
- Parking Lot Setbacks
Locus Map (Show all roads and available building information within 1000 feet)
Plan Index with latest revision date of each plan

2. Legend, Abbreviations, and General Notes

Legends
General Symbols
Abbreviations
General Notes
Construction Notes
Utility Notes

3. Site Survey Plan – Property Plan

Name of Surveyor
Date of survey
Property lines with bearings and distances
Monuments found/ set at all lot corners
Easements with bearings and distances suitable for registry filing
Name of all abutters
Street names
Data confirming that applicant has the legal right to use land shown on plan (easement, right of way, license, etc)

4. Existing Condition Plan

Name of Surveyor/ Engineer
Date of survey/ plan preparation
The survey plans shall be consistent with the Procedural and Technical Standards of 250 CMR 6.00 and shall:

- Tie boundary corners to street line bounds/ benchmarks & describe and locate bound/ benchmark on the plan.
- Cite reference boundary data taken directly from another reference plan with applicable registry recording number and title of said plan
- Find and/ or set monuments at all lot corners
- Establish property, street, boundary lines, etc with bearings and lengths
- Establish easements with bearings and lengths suitable for registry filing
- Reference elevations to NAVD 88
- Horizontal features to be the horizontal coordinate system of the Massachusetts State Plan Coordinate System tied into the North American Datum of 1983 (NAD 83)
- Name all abutters, parcel ID numbers, street numbers, etc, consistent with abutters list
- Show street, alley, park, public open space, etc names

Existing Buildings and Structures

DPW SITE PLAN REVIEW CHECKLIST

- Area of Building
- Number of stories
- Principal use
- Setbacks from property lines
- Floor Elevations & Door Locations with sill elevations

Existing Topography-Contours at 2' intervals (1' contours or additional spot grades if site is flat) and rock or ledge outcrops

Existing site hydrology shall include a description and delineation of existing storm water conveyances, impoundments, and wetlands on or adjacent to the site or into which storm water flows. It shall identify all surface waters and wetlands within a half mile of the project that may receive stormwater runoff from the project and shall delineate the 100-year flood plains, if applicable

Overhead and underground utilities including but not limited to water, sewer, drainage, electric, telephone, cable TV, gas, septic systems, detention structures, drinking water and irrigation wells, underground storage tanks, etc (pipe types, sizes, lengths and slopes, rims and inverts, etc)

Adequate utility information outside the site to verify proposed utility connections

All existing public mains and appurtenances in the right of way frontage of the site at a minimum, including but not limited to water, sewer, drainage, gas, electric, etc

Existing 21E / contaminated site information

Existing parking/paved areas including pavement layout & type

All existing easements with bearings and distances suitable for registry filing

Existing pavement markings within site and on connecting roads

Existing features such as walls, curbing, landscaping trees, walks, fences, trees over 12" caliper, lighting, signs, loading areas, dumpster location etc.

Existing sign summary

Water protection district delineation including offsets and buffer zones

Areas of Critical Environmental Concern

NHESP mapped areas (Priority and Estimated Habitat of Rare Species)

5. Demolition and Erosion Control Plan

Existing Conditions plan plus:

Property lines with bearings and distances

All existing easements with bearings and distances

Wetlands, floodplain, water protection district delineation including offsets and buffer zones

Monuments found/ set at all lot corners

Easements with bearings and distances suitable for registry filing

Name of all abutters

Street names

Benchmark locations (Based on NGVD – show year)

Existing Buildings and Structures to be removed/ demolished

Existing parking/paved areas to be removed/ demolished

Existing utilities to be removed/ demolished

All utility pipe types, sizes, and lengths

DPW SITE PLAN REVIEW CHECKLIST

Existing features to be removed/ demolished such as walls, curbing, landscaping trees, walks, fences, trees over 6" caliper, lighting, signs, etc.

Proposed construction phase drainage infrastructure plan including but not limited to piping and natural watercourse profiles & cross-sections, retention / detention structures, drain manholes, headwalls, water quality BMPs, and erosion & sedimentation control features, etc

Hay bales or hay bale/silt fence combination

Anti-tracking BMP area at all construction entrances

Protect existing and proposed drainage structures with hay bales and or silt sacks

Delineate all stockpile areas

Provide safety fencing around stockpiles over 10' in height or otherwise restrict site access

All BMP erosion control measures shall be in place prior to demolition.

Erosion Control BMPs shall conform to the US EPA, MA DEP, Town of North Reading stormwater requirements

6. Construction/Layout Plan

Existing Condition Plan plus:

Proposed Buildings and Structures, Area of building or additions, Number of stories, Principal use

Setback dimensions from property lines

Proposed topography including but not limited to proposed contours at 2' intervals (1' contours or additional spot grades if site is flat)

Seasonal high groundwater elevation in each area to be altered and in each area to be used for storm water retention, detention, or infiltration to be made by a Massachusetts Approved Soil Evaluator

A drainage area map showing pre- and post- construction watershed boundaries, drainage areas, and storm water flow paths

Test pit locations and surface spot elevation

Proposed parking lots, sidewalks, islands, etc

Parking lot setbacks to property line

Parking lot grades shall not exceed 5% or be less than 0.5%

Parking spaces (delineated and dimensioned)

Handicap parking & access

Wheelchair ramps

Sidewalk & Pavement layout / material type

Curb / berm type (s) and limits

Granite curb at entrance to layout line

Lighted Signs

Proposed Sign Schedule

Pavement markings

All pavement markings and signs shall conform to MUTCD requirements

Loading areas, Dumpster areas, Walls, Fences & Landscape areas and Snow Storage Area

Critical dimensions including aisle widths, parking stall dimensions, curb radius etc...

Grading at entrances -show spot grades if required

Emergency Vehicle Access (WB-50 unless otherwise approved by Town Engineer)

Truck Access (WB-50 unless otherwise approved by Town Engineer)

All handicap parking, ramps, and access shall conform to ADA requirements

DPW SITE PLAN REVIEW CHECKLIST

All perimeter erosion control measures shall be in place prior to construction.
Erosion Control shall conform to the US EPA, MA DEP, Town of North Reading Stormwater requirements

5. Grading and Drainage Plan

Existing Condition and Construction/ Layout Plans plus:

Existing and proposed site grading/ topography-Contours at 2' intervals (1' contours or additional spot grades if site is flat)
Proposed parking lots, sidewalks, islands, etc
Parking lot grades shall not exceed 5% or be less than 1.0 %
Floor elevations & door locations
Proposed drainage infrastructure plan including but not limited to piping and natural watercourse profiles & cross-sections, infiltration/ retention / detention structures, drain manholes, headwalls, roof recharge systems, flow direction, water quality BMPs, etc
Adequate information off site to verify proposed drain connections
Drainage system profiles including rim and invert elevations, material, types, sizes, lengths, utility crossings and slopes
Utility easements with bearings and distances suitable for registry filing
Delineate all stockpile areas
Provide safety fencing around stockpiles over 10' in height or otherwise restrict site access
For applications associated with residential or commercial/industrial subdivisions, include an overall development plan showing all construction activity and proposed grading for all project phases, and show the proposed building envelope within each house lot and the proposed grading, drainage, and stormwater disposal for each lot.

8. Utility Plan

Existing Condition and Construction/ Layout Plans plus:

All proposed utilities including but not limited to Water, Sewer, Drainage, Electric, Telephone, Cable, TV, Gas, Lighting, Septic Systems, Detention/ Retention/ Infiltration Structures, etc
Building finish floor elevations
Invert elevations at utility exits from building
Adequate utility information outside the site to verify proposed utility connections
All utility pipe types, sizes, lengths and slopes
All utility structure information including rim and invert elevations
Proposed Water & Sewer installations shall conform to MA DEP and Town of North Reading rules & regulations
All water services, hydrants, gates, shutoffs, tees
Utilities shall be underground if possible
All transformer locations

DPW SITE PLAN REVIEW CHECKLIST

Required utility easements (minimum 20 foot width) with bearings and distances suitable for registry filing

Sewer profile showing all utility crossings

9. Landscape Plan

Town departments, boards & commissions, such as the Community Planning Commission, Conservation Commission, etc, have requirements for landscaping as part of the project submittals. These plans generally address landscaping after construction is complete. These post construction landscape plans will be incorporated into the Operation & Maintenance (O & M) plan requirements for a Storm Water Management Permit application.

The landscape plan for a Storm Water Management Permit must also address site landscaping & ground cover before & during earth disturbing activities / construction. This landscape plan will be incorporated into the Erosion & Sediment Control Plan. Specific requirements can be found in the Storm Water Management Plan Rules & Regulations, Appendix D, Erosion and Sediment Control Plan.

10. Detail Sheets / Typical Details

Pavement / Sidewalk/ Curb/ Berm/ Driveway Section Detail
Wheelchair Ramp Detail
Concrete Pad Detail
Catch Basin Detail
Drainage Manhole Detail
Sewer Manhole Detail
Water/Sewer/ Drain Trench Details-hydrants/ valves/ services/ thrust blocks/joint restraints/ etc
Water/Sewer/ Drain Details
Detention Basin Outlet Structure Control Detail
Infiltration Facility Outlet Structure Control Detail
Miscellaneous Detention Basin Details
Anti Seepage Collar Detail
Flared End Detail
Rip Rap Detail
Hay bale/Silt Fence/ Catch Basin Silt Barrier Detail
Light Pole Foundation and Conduit Detail
Retaining Wall Details
Traffic & Safety Details
Sign Details
Fence Detail
Flowable Fill Trench
Pavement Marking Details

TOWN OF NORTH READING, MASSACHUSETTS
STORMWATER MANAGEMENT RULES & REGULATIONS

APPENDIX D
EROSION AND SEDIMENT CONTROL PLAN

A. **General.** The Erosion and Sediment Control Plan shall describe the nature and purpose of the proposed development, pertinent conditions of the site and the adjacent areas, and proposed erosion and sediment controls during construction. Applicants shall use the US EPA *Stormwater Pollution Prevention Plan (SWPPP) template for Construction Sites - Unauthorized States* to meet this requirement. This template can be found at <http://cfpub.epa.gov/npdes/stormwater/swppp.cfm#template>. Applicants will follow US EPA and MA DEP Stormwater Policy guidance to complete this SWPPP.

Other submittals will include a letter of transmittal, the site US EPA Construction General Permit (CGP), the site completed MA DEP Checklist for Stormwater Report form (Standard 8), and supporting plans & documents for the proposed activity, erosion and sediment BMPs, etc as appropriate.

B. Additional Guidance on Erosion and Sediment Controls during Construction:

Land clearing and grading during construction exposes soils to erosion, and if not controlled, eroded soils may reach streams, ponds and wetlands causing sedimentation and adding pollutants attached to the soil particles. In addition, removal and disturbance of land cover has significant effect on the rates and volumes of stormwater runoff during the construction period. The following excerpt from Fundamentals of Urban Runoff Mgmt are provided to emphasize the Town of North Reading's concerns that stormwater controls provided during the construction period are equally as important as post-construction stormwater controls:

"Runoff is dramatically increased during the construction phase of site development. Sediment control practices are very seldom designed to provide water quantity control, especially for channel erosion. Thus, the greater the area of disturbance, the greater the peak discharge and total volume of runoff. If stream channel protection is a program goal, the erosion that the permanent stormwater system is intended to reduce or prevent (even if using permanent source controls) may occur prior to implementation of those permanent controls."

As noted in the Massachusetts Stormwater Handbook, BMPs used during construction must be different from the BMPs that will be used to handle stormwater after construction is completed and the site is stabilized. Many stormwater technologies (infiltration technologies) are not designed to handle the high concentrations of sediments typically found in construction runoff, and thus must be protected from construction-related sediment loadings. All proposed construction period BMPs must be properly designed, and sediment traps must be sized to provide adequate capacity and retention time to allow for proper settling of fine-grained soils. Construction period BMPs must also be properly operated and maintained.

Construction sites 10 acres or larger will implement erosion and sediment control measures to comply with the US EPA effluent limitation guidelines.

TOWN OF NORTH READING, MASSACHUSETTS
STORMWATER MANAGEMENT RULES & REGULATIONS

APPENDIX D
EROSION AND SEDIMENT CONTROL PLAN

At a minimum, the following guidelines shall be followed for erosion and sedimentation control, however this list is not exclusive or comprehensive, and applicants should consult available references for further guidance.

1. Prior to any land disturbance activities commencing on the site, the developer shall physically mark the limits of no land disturbance on the site with tape, signs, or orange construction fence, so that workers can see the areas to be protected. The physical markers shall be inspected by the site manager daily.
2. A construction phasing plan shall be included in the Erosion and Sedimentation Control Plan. Land disturbance activities exceeding one (1) acre in size should not be started without a sequencing plan that requires stormwater controls to be installed and the soil stabilized, as disturbance beyond the (1) acre continues. Mass clearings and grading of the entire site shall be avoided. Preserve natural vegetation to minimize erosion.
3. The area of disturbance shall be kept to a minimum. Temporary erosion and sediment control measures shall be installed between May 1 and September 30 to reduce dust and sediment transport. These measures shall be applied as soon as practicable, but in no case more than seven (7) days after land disturbing activity occurs. Disturbed areas remaining idle for more than fourteen (14) days shall be stabilized. Ground cover shall be installed on any portion of a site that is cleared for more than six (6) months.
4. Appropriate erosion and sediment control measures shall be installed prior to soil disturbance.
5. Divert runoff away from highly erodible soils and/or steep slopes; direct runoff to stable areas.
6. Measures shall be taken to control erosion within the project area. Runoff velocities must be kept as low as practicable as the erosive power of runoff increases dramatically as slope and distance increase. Sediment in runoff water shall be trapped and retained within the project area. Wetland areas and surface waters shall be protected from sediment even if work is outside of wetland buffer zones.
7. Sediment shall be removed once the volume reaches $\frac{1}{4}$ to $\frac{1}{2}$ the height of the silt fence or hay bale.
8. Soil stockpiles must be stabilized or covered at the end of each workday. Stockpile side slopes shall not be greater than 2:1. All stockpiles shall be surrounded by sediment controls.
9. Dust shall be controlled at the site.
10. A tracking pad shall be constructed at all entrance/exist points of the site to reduce the amount of soil carried onto roadways and off the site. Any sediment reaching a public or private road shall be removed by street cleaning (not flushing) before the end of each workday.
11. On the cut side of roads, ditches shall be stabilized immediately with stone, rock rip-rap, erosion control matting or other non-erodible liners, or where appropriate, vegetative measures such as hydroseeding or sod; and where channel lining is infeasible and velocity checks are required, check dams shall be put in place.
12. Reduce disturbed surface impermeability to reduce erosion rate. Permanent seeding shall be undertaken in the Spring from March through May, and in late summer and early fall from August to October. During the peak summer months and in the fall after October 15, when seeding is found to be impractical, temporary mulch or erosion control blankets shall be applied as soon as practicable. Permanent seeding may be undertaken during the summer if plans provide for adequate mulching and watering.

TOWN OF NORTH READING, MASSACHUSETTS
STORMWATER MANAGEMENT RULES & REGULATIONS

APPENDIX D
EROSION AND SEDIMENT CONTROL PLAN

- 13 All slopes steeper than 3:1 (h:v, 33.3%), as well as perimeter dikes, sediment basins or traps, and embankments must, upon completion, be immediately stabilized with sod, or loam & seed with anchored straw mulch or mulch blankets, or other approved stabilization measures. Areas outside of the perimeter sediment control system must not be disturbed.
14. The site manager shall monitor and ensure maintenance of erosion and sediment control measures throughout the course of construction. He/ she shall ensure that inspections occur weekly, and before & after each rainfall forecasted to be excess of 1 inch per 24 hours.
15. Temporary sediment trapping devices must not be removed until permanent stabilization is established in all contributory drainage areas. Similarly, stabilization must be established prior to converting sediment traps/basins into permanent (post-construction) stormwater management facilities. As noted, BMPs used during construction must be different from the BMPs that will be used to handle stormwater after construction is completed. However, if temporary and permanent BMP locations, such as basin locations, are the same, then all such facility locations that were used as temporary facilities shall be cleaned (e.g. excavated to remove all silt and sediments) prior to being completed to finished stabilized grades for final operation.
16. All temporary erosion and sediment control measures shall be removed after final site stabilization is confirmed by inspection. Disturbed soil areas resulting from the removal of temporary measures shall be permanently stabilized within 30 days of removal.
17. Discuss the extent and nature of truck traffic onto and off of site (trucks per day, borrow or fill onto the site, excess or unsuitable soil off of site, proposed haul routes, etc).
18. Describe the proposed use of any fill material other than clean, uncontaminated fill
19. Locate and describe industrial discharges, including storm water discharges from dedicated asphalt plants and dedicated concrete plants which are covered by this permit,
20. Describe construction and hazardous /waste materials expected to be stored on-site and intended storage, use, and disposal methods. The plan shall include a description of controls to reduce pollutant release from these materials, including storage practices to minimize exposure of the materials to storm water, and spill prevention and response,
21. Prohibited discharges include dewatering activities and concrete washout activities (unless managed by appropriate controls); wastewater from the washout of stucco, paint, form release oils, curing compounds and other construction materials; fuels, oils, or other pollutants used in vehicle and equipment operation & maintenance; and soaps & solvents used in vehicle and equipment maintenance.

TOWN OF NORTH READING, MASSACHUSETTS
STORMWATER MANAGEMENT RULES & REGULATIONS

APPENDIX E
OPERATION & MAINTENANCE PLAN

A. Operation and Maintenance Plan Requirements. An O&M Plan shall include:

1. The name(s) of the owner(s) for all components of the system.
2. A plan that is drawn to scale showing the location of the systems and facilities including catch basins, manholes/access lids, drain lines, and stormwater BMPs in each treatment train along with the discharge points. Include a description and delineation of all public safety features.
3. A copy of the Long Term Pollution Prevention Plan (as required for submittal with the Stormwater Management Plan (see Appendix C).
4. An estimated operations and maintenance budget & anticipated source of funding.
5. A maintenance agreement that specify:
 - (a) The names and addresses of the person(s) responsible for operation and maintenance;
 - (b) The person(s) responsible for financing maintenance and emergency repairs;
 - (c) An Inspection and Maintenance Schedule for all stormwater management facilities including routine and non-routine maintenance tasks to be performed;
 - (d) A list of easements with the scope and location of each; and
 - (e) The signature(s) of the owner(s).
6. The Building Inspector may require the posting of a performance or maintenance guarantee.

B. Stormwater Management Easement(s).

1. Stormwater management easements shall be given by the property owner(s) as necessary for:
 - (a) Access for facility inspections and maintenance;
 - (b) Preservation of stormwater runoff conveyance, infiltration, and detention areas and facilities, including flood routes for the 100-year storm event; and
 - (c) Direct maintenance access by heavy equipment to structures requiring regular cleanout maintenance.
2. The scope of each easement shall be sufficient to allow the work described in this section and specified in the maintenance agreement signed by the property owner.
3. Stormwater management easements are required for all areas used for off-site stormwater control, unless a waiver is granted by the Building Inspector.
4. Easements shall be recorded with the Middlesex County Registry of Deeds prior to issuance of a Certificate of Completion by the Building Inspector.
5. For publicly owned or maintained stormwater facilities, the easement will be from the land owner to the town. For off site stormwater facilities, the easement shall be from the off site land owner to the property generating the stormwater.

C. BMPs serving multiple lots or properties.

1. In the case of stormwater BMPs that are serving more than one lot, the applicant shall include with the O & M Plan a description for implementing and enforcing the O & M Plan.
2. The applicant shall identify the lots or units that will be serviced by the stormwater BMPs, and provide a copy of the legal instrument (deed, homeowner's association, utility trust or other legal

TOWN OF NORTH READING, MASSACHUSETTS
STORMWATER MANAGEMENT RULES & REGULATIONS

APPENDIX E
OPERATION & MAINTENANCE PLAN

entity) that establishes the terms of and legal responsibility for the operation and maintenance of stormwater BMPs.

3. In the event that the stormwater BMPs will be operated and maintained by an entity, municipality, state agency or person other than the sole owner of the lot upon which the stormwater management facilities are placed, the applicant shall provide a plan and easement deed (as noted in subsection B. above) that provides a right of access for performance of said operation and maintenance functions.
4. At the time of issuing its decision on a Storm Water Management Permit application, the Building Inspector may require that the permittee provide a copy of Storm Water Management Permit conditions and the legal instrument to each unit or lot owner at or before the purchase of each unit or lot to be serviced by the stormwater BMPs.

D. Changes to Operation and Maintenance Plans.

1. The owner(s) of the stormwater management system must notify the Building Inspector of changes in ownership or assignment of financial responsibility.
2. The maintenance schedule in the maintenance agreement may be amended to achieve the purposes of the Bylaw and the Regulations by mutual agreement of the Building Inspector and the parties responsible for the implementation of the schedule. Amendments must be in writing and signed by such parties. Such parties shall include owner(s), persons with financial responsibility, and persons with operational responsibility.
3. Once the amended O&M Plan is signed, a copy shall be filed at the Registry of Deeds at the expense of the current owner(s).

E. Annual Report Submittal. The parties responsible for O&M Plans must submit annual reports regarding the inspection and maintenance of the stormwater BMPs for which they are responsible. The reports must include:

1. Descriptions of the condition of the BMPs;
2. Descriptions of inspection and maintenance work performed (the O&M log); and
3. Receipts for any payments made for maintenance performed.

E. Records: The permittee shall:

1. Maintain an operation and maintenance log (a rolling log recording all O&M activities for the past three (3) years), including inspections, repairs, replacement and disposal (for disposal, the log shall indicate type of material and disposal location);
2. Make this log available to MA DEP and the Building Inspector upon request; and
3. Allow members and agents of the MA DEP and the Building Inspector to enter and inspect the premises to evaluate and ensure that the permittee complies with the Operation and Maintenance Plan requirements for each BMP.